

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1           1-17. (Withdrawn)

1           18. (Currently Amended) A differential GMR sensor, comprising:

2           a first self-pinned GMR sensor having a first pinned layer, a first spacer layer and  
3           a first free layer;

4           ~~a bias structure over the first free layer, wherein the bias structure is formed to~~  
5           ~~provide antiparallel magnetizations for the first and second free layers without using an~~  
6           ~~antiferromagnetic layer; and~~

7           a second self-pinned GMR sensor having a second pinned layer, a second spacer  
8           layer and a second free layer; and

9           a bias structure disposed between the first free layer of the first self-pinned GMR  
10          sensor and the second free layer of the second self-pinned GMR sensor, wherein the bias  
11          structure is configured to provide antiparallel magnetizations for the first and second free  
12          layers without using an antiferromagnetic layer.

1           19. (Currently Amended) The sensor of claim 18, wherein the bias structure  
2           further comprises four ferromagnetic layers separated with three interlayers selected to  
3           provide a desired gap length.

1           20. (Original)     The sensor of claim 18, wherein the bias structure further  
2           comprises four ferromagnetic layers separated with three interlayers.

1           21.     (Currently Amended) The sensor of claim 20, wherein the four  
2     ferromagnetic layers further [[ comprises ]] comprise four NiFe layers.

1           22.     (Currently Amended) The sensor of claim 21, wherein the four NiFe [[  
2     comprises ]] comprise a nickel composition of 90%.

1           23.     (Currently Amended) The sensor of claim 20, wherein the three  
2     interlayers further [[ comprises ]] comprise ruthenium.

1           24-33. (Withdrawn)

1           34.     (Currently Amended) A magnetic disk recording system, comprising:  
2           a magnetic storage medium having a plurality of tracks for recording of data; and  
3           a magnetic transducer maintained in a closely spaced position relative to the  
4     magnetic storage medium during relative motion between the magnetic transducer and  
5     the magnetic storage medium, the magnetic transducer including a magnetoresistive read  
6     sensor, the magnetoresistive read sensor further comprising:

7                     a first self-pinned GMR sensor having a first pinned layer, a first spacer  
8     layer and a first free layer;

9                     ~~a bias structure over the first free layer, wherein the bias structure is~~  
10    ~~formed to provide antiparallel magnetizations for the first and second free layers without~~  
11    ~~using an antiferromagnetic layer; and~~

12                     a second self-pinned GMR sensor having a second pinned layer, a second  
13    spacer layer and a second free layer; and

14                     a bias structure disposed between the first free layer of the first self-pinned  
15    GMR sensor and the second free layer of the second self-pinned GMR sensor, wherein  
16    the bias structure is configured to provide antiparallel magnetizations for the first and  
17    second free layers without using an antiferromagnetic layer.

1           35.     (Currently Amended) The magnetic disk recording system of claim 34,  
2     wherein the bias structure further comprises four ferromagnetic layers separated with  
3     three interlayers selected to provide a desired gap length.

1           36.     (Original)     The magnetic disk recording system of claim 34, wherein  
2     the bias structure further comprises four ferromagnetic layers separated with three  
3     interlayers.

1           37.     (Currently Amended) The magnetic disk recording system of claim 36,  
2     wherein the four ferromagnetic layers further [[ comprises ]] comprise four NiFe layers.

1           38.     (Currently Amended) The magnetic disk recording system of claim 37,  
2     wherein the four NiFe [[ comprises ]] comprise a nickel composition of 90%.

1           39.     (Currently Amended) The magnetic disk recording system of claim 36,  
2     wherein the three interlayers further [[ comprises ]] comprise ruthenium.

1           40-49. (Withdrawn)

1           50.   (Currently Amended) A differential GMR sensor, comprising:  
2           first self-pinned means having a first pinned layer, a first spacer layer and a first  
3 free layer;  
4           a second self-pinned ~~GMR sensor~~ means having a second pinned layer, a second  
5 spacer layer and a second free layer; and  
6           means, disposed between the first free layer of the first self-pinned means and the  
7 second free layer of the second self-pinned means, for biasing the first and second ~~pinned~~  
8 free layers of the first and second self-pinned means to provide antiparallel  
9 magnetizations for the first and second free layers without using an antiferromagnetic  
10 layer.